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ABSTRACT

TEAMS Distance Learning is an Educational Telecommunications Network service of the Los Angeles County Office of Education (California). It provides live, interactive instructional telecasts for students in grades two through six and their teachers and parents across the United States and in Canada. This evaluation summary consists of an overview of the evaluation design and products of the evaluation. Thirty-seven schools which used TEAMS were selected as Planning and Evaluation (PEP) sites from regions across the country. Information and data were collected through survey instruments and PEP site visits. A TEAMS Student Progress Form was sent to every TEAMS teacher as part of the survey. TEAMS focuses on a Three-Tier Distance Learning Staff Development Model for teachers that includes theoretical training, implementation training, and simultaneous teacher training and student instruction. There are seven Levels of Use identified in the Concerns Based Adoption Model, and staff who are adopting an innovation will move up these levels. Teachers reported that they viewed the TEAMS television teacher as a role model and demonstrator of new teaching methods and as a result, they were able to move easily through the levels of adoption. Based on the results of the 1992-96 TEAMS evaluation, an Implementation Model for TEAMS was validated. Teachers, students, principals, and site coordinators reported that they liked TEAMS programming and that it was increasing time allocated to and teaching/learning skills in mathematics and science. Nine tables present results of student progress attributed to TEAMS, changes in the Distance Learning Professional Development Model, and factors that facilitated or impeded the use of TEAMS. (AEF)

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TEAMS 1992-96
Evaluation Summary

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TEAMS Distance Learning is an Educational Telecommunications Network (ETN®) service of the Los Angeles County Office of Education (LACOE). The TEAMS Project was funded through the Star Schools Programs of the United States Department of Education, Office of Educational Research and Improvement (OERI) from 1990-96.

TEAMS provides live, interactive instructional telecasts for students in grades two through six, their teachers and parents across the country and in Canada. Programs are designed by specialists in curriculum, instruction and parent education, using input from students, parents and staffs of participating agencies. Programs are produced and telecast through a cooperative effort between the TEAMS staff and ETN®.

Evaluation Plan

The 1992-96 evaluation plan for the TEAMS Star Schools Program was designed as a formative and summative data collection. It provides data from the project as a whole, as well as in-depth data from designated evaluation sites across the country. The research study focused on answering questions about:

- Impact of TEAMS on students, parents and staff
- Adoption and institutionalization of TEAMS in each area, including its impact on systemic reform
- How TEAMS promoted the adoption of the National Educational Goals

Evaluation Design

The TEAMS evaluation design was based on the Context, Input, Process, Product (CIPP) Evaluation Model developed by Daniel Stufflebeam, et. al. It also contains the major elements of Concerns Based Adoption Model (CBAM) which measures the adoption of an innovation. It was developed by Gene Hall and Susan Loucks.

Part I: Overview of Evaluation Design

A. Project Goals and Objectives

B. Overall Project

1. Context: How is the TEAMS project organized?
   How is each partner region organized for TEAMS?
   How has TEAMS developed in that region?
2. Input: What resources has TEAMS provided in each region?
   What resources were added through the PBS pilot with PMN?
   What resources were added through other partnerships?
   What resources have states, regional agencies, districts, schools and others provided?
3. Process
   a. Installation: How have districts, schools, teachers been selected to participate?
      What are patterns of beginning implementation of TEAMS?
   b. Implementation: How have TEAMS programs been delivered?
      What technical assistance has been given?
      What support materials and process are available?
      Teacher Involvement
      How are first through sixth year users involved with TEAMS?
4. Product (Outcomes)
   How many participants, districts, states received services; what kinds of services were received?
   What are the participants' demographic characteristics?
   What is the difference in using live or tape versions of programs?
   What types of interaction creates the greatest benefits?
   What have been the benefits to teachers, students, parents and administrators?
   What are the effects of being part of a national telecommunications project?
   What are the effects of being part of TEAMSNet?
   What outcomes resulted from the PBS pilot with PMN?
   What outcomes resulted from other partnership?

C. In-depth data from selected TEAMS sites

1. Context School data
   Support structures
   Resources
   Reform efforts
   Demographics
   Testing, assessment information
   Behavioral and attendance information
   TEAMS student data
   Demographics
   Testing, assessment information
   Behaviora' and attendance information
   TEAMS Teacher data
   Demographics

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Education and training
Teaching experience
Participation in reform efforts

2. Input TEAMS Planning: Resources Used for TEAMS
3. Process Installation: How did the school learn about TEAMS?
How did they decide to use TEAMS?
How did they get ready to use TEAMS ?
Organization: How are they organized to use TEAMS ?
Implementation: How do they use the TEAMS programs?
How do the teachers prepare for the TEAMS programs?
How do the teachers facilitate and manage the TEAMS programs?
How do they use the support materials?
What pre and post activities do they use?
How do they assess the impact of the TEAMS programs?
Program Series Evaluation: How do they rate the TEAMS program series?
CBAM: What Stages of Concern are teachers in at various points of implementation:
Beginning use of TEAMS: First through sixth year of TEAMS use
What level of use is related to each year in TEAMS?
What is the innovation configuration of TEAMS at the site
4. Product: How has TEAMS benefited the school as a whole?
What changes have students experienced from TEAMS?
What benefits have teachers experienced from TEAMS?
What benefits do parents see or experience?

Part II: Products of the Evaluation

A. Report on Organization, Installation, Implementation and Impact of TEAMS
B. TEAMS School Intervention Plan
C. Teacher Involvement and Use of TEAMS by Year in Program
D. Successful TEAMS School Site Models

Planning and Evaluation Project (PEP) Sites

Each school which used TEAMS was asked to nominate itself as a Planning and Evaluation Project (PEP) Site. Regional TEAMS Coordinators worked with schools to complete the nomination forms. Nomination forms required data on demographics of the school and agreement to in-depth study techniques including the site visit, if they received the nomination. Each region nominated several more schools than were required so that the evaluation team could make the final PEP school selection based on demographics that reflected diversity. Originally 35 sites were to be selected, but two others were added (one in Washington, DC and one in Utah) bringing the total to 37 in-depth study sites. In 94-6, new partners provided sites for implementation site visits.

Methods

Information and data were collected for the evaluation through two primary methods, survey instruments and PEP site visits. Survey instruments were developed for administrators at the PEP in-depth study sites, teachers at PEP in-depth study sites, TEAMS teachers at regular sites, TEAMS regional coordinators, and Pacific Mountain Network (PMN) public television station affiliates.

Site visits were made to the PEP School sites during each year. At each site, focus interviews were conducted with principals, teachers, resource teachers, other involved staff and, at some sites, with the students. Classroom use of a TEAMS program was observed where possible. TEAMS programs were not always being broadcast or used on the day of the site visit. Most site visits were conducted in the classroom where the students used TEAMS as substitute teachers were not available.

Pep sites were located in Los Angeles County, Los Angeles, Boston, Detroit, St. Louis, Kansas City, Washington, DC, Utah, Arizona, Missouri, North Carolina, Georgia and New Mexico.,

Respondents

Respondents	1993	1994	1995
PEP School Administrators	73	37	43
PEP Site TEAMS Teachers		113	125
TEAMS Teachers	203	330	335
TEAMS Regional Coordinators	8	8	11
Pacific Mountain Network Affiliates		9	10
Students	284	7,299	8,235

Summary of Results

A TEAMS Student Progress Form was sent to every TEAMS teacher as part of the survey instrument. The form collected basic information on gender and participation in Chapter 1, LEP, Gifted, and Special Education programs. The form asked the TEAMS teacher to describe the degree of the outcome for each student that could be attributed solely to using TEAMS. The scale of one to four was used where four was a great degree and one was none. Teachers ranked the 7,299 in 1994 and 8,235 in 1995 students on the following attributes.

Improved Content Knowledge and Skills
Improved Critical Thinking and Problem Solving
Improved Language Skills
Increased Interest in the Subject Area
Improved Quality of Work
Increased Interest in School
Improved Attendance
Improved Behavior
Takes Responsibility for Own Learning
Greater Confidence as Learner
Higher Self-Regard

Usable data was returned for 7,299 students in 1994, and 8,235 studsents in 1995, make this the largest study conducted with students participating in a Star Schools Project. It is also the largest study conducted of students in a distance learning program during this period of use of technology for education. While other studies of student learning have generally focused on whether students learn as much or as well from educational technology as from traditional classrooms, the TEAMS evaluation focused on students using the same programs and the same technology, but studied other educational outcomes as an indication of the success of the TEAMS program.

The evaluation also focused on new ways to gather information about student learning outcomes. While it has become apparent that students learn as well from educational uses of technology, the use of standardized test scores does not report all of the learning that is taking place. It is important that the developers of standardized tests begin to include ways to measure the new skills that students are learning, that society values, and are mandated through the Educate America Act: Goals 2000..

The TEAMS student progress form created for the TEAMS Star Schools Project endeavored to develop a significant new method to collect and assess student learning and improvement through distance learning programs. The form was successfully used by teachers and is used throughout the evaluation of TEAMS Star Schools Project.

Results of Student Progress Attributed to TEAMS

A series of multiple linear regressions were performed on the data. For all of the student results, no noted change in a variable did not mean that the student was working at an F grade level. TEAMS programming is seldom used as the only source of mathematics or science education in the classroom. Teachers may have been unable to see a change which was directly attributable to TEAMS programming and thus recorded a score of one (no change due to TEAMS) rather than a score of two to four showing change due to TEAMS. For example, many teachers noted on their survey instruments that students always came to class and there was little room for improvement in the question about increased attendance. Other teachers noted that the behavior in their classrooms was always good and thus, a score of one for no change, was not to be a considered a bad mark or a poor reflection on TEAMS. Simple regressions were conducted using "improved content knowledge and skills" as the dependent variable. All independent variables were significant at the level of P=.0001 (see Table 1).

Table 1: Simple Regressions on the Dependent Variable Improved Content Knowledge and Skills

Independent Variable	Coefficient	Std. Error	Std. Coeff.	t-Value	P-Value
Intercept	2.944	.013	2.944	223.680	<.0001
M/F	-.038	.019	-.024	-2.025	.0429
Intercept	3.010	.013	3.010	233.948	<.0001
Ch 1	-.179	.019	-.111	-9.564	<.0001
Intercept	2.976	.011	2.976	271.799	<.0001
LEP-	.189	.021	-.104	-8.915	<.0001
Intercept	2.895	9.810E-3	2.895	295.069	<.0001
Gifted	.332	.032	.120	10.303	<.0001
Intercept	2.950	9.700E-3	2.950	304.092	<.0001
Special Ed	-.314	.033	-.112	-9.639	<.0001
Intercept	.625	.019	.625	32.476	<.0001
Thinking	.807	6.481E-3	.824	124.440	<.0001
Intercept	1.504	.024	1.504	63.633	<.0001
Language	.541	8.514E-3	.597	63.493	<.0001
Intercept	.942	.025	.942	38.164	<.0001
Subject Interest	.659	7.901E-3	.699	83.449	<.0001
Intercept	1.432	.024	1.432	60.148	<.0001
Quality	.563	8.534E-3	.611	65.992	<.0001
Intercept	1.629	.024	1.629	67.763	<.0001
School	.490	8.587E-3	.555	57.036	<.0001
Intercept	2.352	.021	2.352	112.473	<.0001
Attendance	.269	8.889E-3	.334	30.246	<.0001
Intercept	2.183	.022	2.183	100.669	<.0001

Behavior	.330	8.847E-3	.400	37.330	<.0001
Intercept	1.645	.023	1.645	70.448	<.0001
Responsibility	.494	8.483E-3	.563	58.194	<.0001
Intercept	1.502	.024	1.502	62.995	<.0001
Confidence	.531	8.424E-3	.594	62.992	<.0001
Intercept	1.596	.024	1.596	67.678	<.0001
Regard	.503	8.441E-3	.572	59.612	<.0001

In the multiple linear regression which used "improved content knowledge and skills" as the dependent variable, ten independent variables were found to be significant at P= .05 and above. Improvement was significant for Chapter 1, LEP and Special Ed TEAMS students. Teachers throughout the US. saw improvement for these students in improved critical thinking and problem solving, language skills, increased interest in the subject area, improved attendance and behavior, and improvement in the responsibility the students took for their own learning as well as a positive increase in student self regard (see Table 2).

Table 2: Results of Multiple Linear Regression on Content Knowledge and Skills

Improved Content Knowledge and Skills Intercept P=.0001

Variable	P
Chapter 1	P=.0005
LEP	P=.0072
Special Ed	P=.0113
Improved Critical Thinking and Problem Solving	P=.0001
Improved Language Skills	P=.0001
Increased Interest in the Subject Area	P=.0001
Improved Attendance	P=.0001
Improved Behavior	P=.0324
Takes Responsibility for Own Learning	P=.0333
Higher Self-Regard	P=.0019

A multiple linear regression was done using "increased interest in the subject area" as the dependent variable. Nine independent variables were significant in this procedure. TEAMS teachers saw improvement for special education and gifted students in improved critical thinking and problem solving, quality of work, increased interest in school, improved attendance and behavior, and improvement in the confidence students had in themselves as learners (see Table 3).

Table 3: Results of Multiple Linear Regression on Increased Interest in Subject Area

Increased Interest in the Subject Area Intercept P=.0000

Variable	P
Gifted	P=.0001
Special Ed	P=.0206
Improved Content Knowledge and Skills	P=.0001
Improved Critical Thinking and Problem Solving	P=.0001
Improved Quality of Work	P=.0001
Increased Interest in School	P=.0001
Improved Attendance	P=.0001
Improved Behavior	P=.0177
Greater Confidence as Learner	P=.0001

To determine specifically what improvements teachers were attributing to the four groups of students, multiple linear regressions were performed for each of the four groups individually (as the dependent variable) and using the twelve assessment criteria as independent variables.

For Chapter 1 students, the independent variables that were significant were improved content knowledge and skills, improved critical thinking and problem solving, improved language skills, improved quality of work, improved attendance, and a higher self-regard (see Table 4).

For gifted students, the independent variables that were significant were gender, improved critical thinking and problem solving, improved language skills, increased interest in the subject area, improved quality of work, increased interest in school, improved attendance, improved behavior and a higher self-regard (see Table 5).

For limited English proficient (LEP) students, the independent variables that were significant were improved content knowledge and skills, improved critical thinking and problem solving, improved language skills, increased interest in the subject area, improved quality of work, improved attendance, an increase in taking responsibility for their own learning, and a higher self-regard (see Table 6).

For special education students, the independent variables that were significant were gender, improved content knowledge and skills, improved critical thinking and problem solving, an increase in taking responsibility for their own learning, and a greater confidence as a learner (see Table 7).

The intercept P on each of these groups of students shows that the TEAMS (Apollo 2000) program is significantly impacting the learning of these students.

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Table 4: Results of Multiple Linear Regression on Chapter 1 Students

Chapter 1 Students — Intercept P=.0001

Variables	P
Improved Content Knowledge and Skills	P=.0001
Improved Critical Thinking and Problem Solving	P=.0001
Improved Language Skills	P=.0001
Improved Quality of Work	P=.0004
Improved Attendance	P=.0403
Higher Self-Regard	P=.0001

Table 5: Results of Multiple Linear Regression on Gifted Students

Gifted Students — Intercept P=.0525

Variables	P
Male/Female	P=.0724
Improved Critical Thinking and Problem Solving	P=.0001
Improved Language Skills	P=.0255
Increased Interest in the Subject Area	P=.0001
Improved Quality of Work	P=.0001
Increased Interest in School	P=.0010
Improved Attendance	P=.0025
Improved Behavior	P=.0463
Higher Self-Regard	P=.0031

Table 6: Results of Multiple Linear Regression on LEP Students

Limited English Proficient (LEP) Students — Intercept P=.0001

Variables	P
Improved Content Knowledge and Skills	P=.0001
Improved Critical Thinking and Problem Solving	P=.0004
Improved Language Skills	P=.0001
Improved Quality of Work	P=.0019
Improved Attendance	P=.0023
Takes Responsibility for Own Learning	P=.0072
Higher Self-Regard	P=.0079

Table 7: Results of Multiple Linear Regression on Special Education Students

Special Education Students — Intercept P=.0001

Variables	P
Male/Female	P=.0001
Improved Content Knowledge and Skills	P=.0146
Improved Critical Thinking and Problem Solving	P=.0035
Increased Interest in the Subject Area	P=.0156
Takes Responsibility for Own Learning	P=.0012
Greater Confidence as Learner	P=.0006

TEAMS Distance Learning Staff Development Model

TEAMS focuses on a Three-Tier Distance Learning Staff Development Model for teachers (Cassidy, 1990). The approach includes:

1. Theoretical Training: information, theory, demonstration and two-way communication about the theoretical basis of the TEAMS instruction and training
2. Implementation Training: theory, demonstration, practice and peer discussion of curriculum and instructional methods involved in the student programming, providing training to implement the student programs.
3. Simultaneous Teacher Training and Student Instruction: teacher training through in-class experience, practice and support from the studio team-teacher, through live, interactive student instructional programs. For TEAMS, this three-tiered approach has provided answers for many problems associated with traditional staff development design.

- It is long term, sequential training
- It fosters immediate transfer of learning, with new skills becoming a part of the teacher's repertoire of instructional methods
- It is primarily conducted in the teacher's classroom during the regular school day
- It creates immediate changes in the roles of the teacher and student
- It provides opportunities for teachers to see students being successful with a rich and challenging curriculum. This allows them to change attitudes and behaviors related to instruction and expectations of their students.
- It provides motivation for teachers to participate in other staff development after the regular school day because it is directly related to their classroom program

This model, developed by Sheila Cassidy for TEAMS Distance Learning, is based on research and practice in the fields of staff development and adult learning, as well as national and state standards and guidelines. The basis of the staff development research is formed by work by: Joyce and Showers; Cassidy and Taira; and the Rand Corporation. The adult learning principles are summarized in work by Jones and Woodcock.

The staff development research (Joyce & Showers, 1988) provides compelling data on the relationship between training outcomes and specific training components. They analyzed the relationship between the training outcomes of knowledge, skill and transfer of training for participants engaged in training programs options providing:

1. Information
2. Theory
3. Demonstration
4. Theory and demonstration
5. Theory and practice
6. Theory, demonstration and practice
7. Theory, demonstration, practice and feedback
8. Theory, demonstration, practice, feedback and coaching

Their research clearly shows that training which provides only information and theory produces only increased knowledge in participants. That encompassing any of options numbers four through eight shows greater knowledge and skill outcomes. Option eight provides the greatest outcomes in knowledge, skills, and transfer of training. Practice, feedback, and coaching can be considered an in-classroom, on the job, experiential and support component. With its three tiers, TEAMS provides a distance learning alternative to option eight. It clearly provides theory, demonstration and practice. Although distance learning cannot provide a full face-to-face feedback and coaching component, part of what feedback and coaching provides is an in-class support system. That is provided through the in-class team teaching with the studio instructor.

In retraining of teachers, Cassidy and Taira (1988, 1989) found that teachers reported the factors which contributed to their success were: a sound theoretical basis; experience and practice with the particular curriculum and instruction being adopted/adapted; a support system designed specifically to their needs; convenience, with training during the school day and at their own site when possible; training with no expense to the teacher. The simultaneous in-class training component of TEAMS meets all of these criteria.

The Rand Corporation found that successful projects had these common characteristics for staff development (Berman and McLaughlin, 1978):

1. Training is concrete, continual, and tied to the world of the teacher
2. Local resource personnel provide direct follow-up assistance
3. Peer observation and discussion provide teachers with reinforcement and encouragement
4. School leader participates in staff development
5. Regular meeting held with teachers for problem solving and adapting techniques and skills of the innovation
6. Released time used for teacher staff development
7. Staff development planned with teachers prior to and during the project

Cassidy (1985) reviewed programs with findings similar to the Rand study but with additional information.

1. Individualized staff development activities are more effective than large-group activities
2. Programs using demonstrations, trials, and feedback of ideas are more effective than lecturing and reading.
3. Staff development programs are more successful when teachers are active planners and help each other.

Jones and Woodcock (1984) describe these adult learning principles:

1. The adult is a partner with the instructor in the learning process
2. Adults are capable of taking responsibility for their own learning
3. Adult learners gain through two-way communications
4. Adults learn through reflection on their and others' experience
5. Adults learn what they perceive to be useful in their life situations
6. Adults' attention spans are a function of their interest in the experience
7. Adults are most receptive to instruction that is clearly related to problems they face daily
8. Adults learn best when they are treated with respect
9. Adults do not typically see themselves as learners
10. Adults learn better in a climate that is informal and personal
11. Adult learners apply learning's that they have been influential in planning
12. Adults learn when they feel supported in experimenting with new ideas and skills
13. Adults may have somewhat fixed points of view that make them closed to new ways of thinking and behaving
14. Adults learn to react to the differential status of members of the group
15. Adults are internally motivated to develop increased effectiveness
16. Adults filter their learning through their value system

Levels of Use

There are seven Levels of Use identified in the Concerns Based Adoption Model (CBAM), and staff who are adopting an innovation will move up these levels in seven different areas During the two years of this evaluation, TEAMS teachers were surveyed and interviewed to determine at what level of use they were working. By determining their level of use and the time each takes to move through the levels, it may be possible to plan an implementation strategy that will reduce the time to adopt the innovation of distance learning, and specifically TEAMS programming. The levels and areas are as follows.

0: Non-use: State in which the user has little or no knowledge of the innovation, no involvement with the innovation, and is doing nothing toward becoming involved.

I: Orientation: State in which the user has recently acquired or is acquiring information about the innovation and/or has recently explored or is exploring its value orientation and its demand upon user and user system.

II: Preparation: State in which the user is preparing for first use of the innovation.

III: Mechanical Use: State in which the user focuses most effort on the short-term, day-to-day use of the innovation with little time for reflection. Changes in use are made more to meet user needs than client needs.

IV A: Routine: Use of the innovations stabilized. Few if any changes are being made in ongoing use. Little preparation or thought is being given to improving innovation use or its consequences.

IV B: Refinement: State in which the user varies the use of the innovation to increase the impact on clients within immediate sphere of influence. Variations are based on knowledge of both short and long term consequences for clients.

V: Integration: State in which the user is combining own efforts to use the innovation with related activities of colleagues to achieve a collective impact on clients within their common sphere of influence.

VI: Renewal: State in which the user re-evaluates the quality of use of the innovation, seeks major modifications of or alternatives to present innovation to achieve increased impact on clients, examines new developments in the field, and explores new goals for self and the system.

A New Model of Teacher Training

The pattern that emerged during the evaluation has created a new model for teacher preservice and in-service. TEAMS teachers reported that they viewed the TEAMS television teacher as a role model. As a result, they were able to move easily through the levels of adoption.

First year TEAMS teachers continued to report that there was a great deal of preparation. They read the printed materials provided, set out the materials for students, and watched the programs with students. First year TEAMS teachers who used the program on videotape usually previewed the tape. First year TEAMS teachers reported that they felt that the programs required extensive study by them to learn the new instructional methods. However, they felt the time was profitable because their students were learning so much more and enjoyed the new instructional methods. First year TEAMS teachers move through the third level of use.

Second year TEAMS teachers reported that because they now had an understanding of the instructional methods as well as TEAMS, they spent significantly less time preparing for programs. Their higher level of comfort with the methods gave them the confidence to use the methods in other math or science classes with their students. These methods included hands on, discovery, and collaborative group learning. Many teachers described the television instructor as a role model. They gained confidence in their skills because the television teacher provided step by step guidance in presenting material to students. Teachers reported that they received more usable information on new instructional methods through TEAMS programming than through in-service seminars. Second year TEAMS teachers are in the IV A level of use - routine.

Third year TEAMS teachers continued to report that they were very comfortable with programming and instructional methods. They spent a small amount of time gathering the class materials for programs. This group also reported that the instructional methods had become natural extension of their teaching style. They use the new instructional methods across the curriculum and appear to have full adopted the methods. Third year TEAMS teachers are in the IV B level of use - refinement.

Fourth year TEAMS teachers reported that they have fully adopted the instructional methods embodied in the TEAMS programming. They continue to use the TEAMS programs because students enjoy it and learn from it. They continue to use their new methods across the curriculum. These instructors have also become mentor to new TEAMS instructors at their schools. Fourth year TEAMS teachers are in the V level of use - integration. Some have moved to the VI level of use - renewal.

Using TEAMS has effectively provided teachers with new methods which they use because they have watched the television teacher demonstrate the methods. Immediately after viewing the program, TEAMS teachers apply the methods with their students. These results were reported across the United States at all evaluation sites as well as in the surveys. Principals also noted these changes in teachers saying that TEAMS teachers showed more enthusiasm for math/science, a higher use of interactive and hands-on methods, and that teachers were more confident of their ability to teach math and science. (on a scale of one to four where four is high) was 2.4; second year TEAMS teachers' mean was 2.5; and third year teachers scored the question at a mean of 2.7.

TEAMS teachers continued to report an increase in the ability to teach heterogeneous groups, teach math/science in an active learning environment, manage a class of students using manipulatives, use cooperative learning in math/science instruction, involve parents in their child's math/science education, use the textbook as a resource rather than as the primary instructional tool, use a variety of alternative assessment strategies, and follow national mathematics standards/science recommendations. The model that has evolved from TEAMS is many faceted. A comparison of the existing professional development model and the new TEAMS distance learning professional development model is shown in Table 8.

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Table 8: Distance Learning Professional Development Model

Existing Professional Development Model	New DL Professional Development Model
Face -to-face	Distance learning delivered
Inservice day (2-4 per year): 8-24 per year	Weekly 1-1/2-2 hours per week: 64 hours per year
Travel to inservice site	Delivered to teacher's classroom/site
In-service instructor has a limited ability to develop as a role model for the teacher	Role model provided to teacher by distance learning instructor
Large inservice group	One-to-one
Short demonstration	Full step-by-step and frequent demonstration
Limited examples	Variety of examples
Very limited hands-on	Twice weekly hands-on
Support: Limited access to follow-up with inservice provider	Support: Direct and frequent access to distance learning instructor via television, telephone, fax, computer
Limited opportunity to process information/apply it	Provides opportunity to process information/apply it
Limited application of new information	Immediate application of new information
Students are seldom included in in-service	Provides opportunities for teachers to see students being successful; allows attitude and behavior changes related to instruction and expectations of their students.
Print materials limited to handouts	Full print materials which provide theory, information, methods, and implementation for student programs
Instructional materials are not provided	All instructional materials are provided
Use text as the primary instructional tool	Used the text only as a resource
General instructions	Content specific instructions
No opportunity to review	Tape review
Costs: non-teaching days or substitute	Costs: nothing additional Two for one - students and teachers
Instruction only for the teacher	Simultaneous teacher training and student instruction:
Results: Limited	Results: Significant change
Little change in teaching methods	Significant change in teaching methods
Limited increase in content teaching time	Increase in content teaching time
Limited gain in non-specialty content area	Significant gain in non-specialty content area knowledge and comfort level
Limited gain confidence to teach non-specialty areas	Significant gain confidence to teach non-specialty areas
Limited increase in use of instructional methods across the curriculum	Uses new instructional methods across the curriculum
Limited increase in mentoring	Become mentors to new instructors
Limited movement to higher levels of use	Moves teachers to higher levels of use

TEAMS Distance Learning Program Implementation Model

Based upon the results of the 1992-1996 TEAMS evaluation, an Implementation Model for TEAMS was validated. There are a variety of elements to the model which include components for the site implementation and components for the instructional program series to be fulfilled by the TEAMS staff.

For a large distance learning project such as TEAMS, an implementation model is necessary so that the adoption of the innovation of distance learning is successful at each site. As more districts subscribe to the program, it is important that they have a plan to follow which clearly defines the steps to follow to ensure a successful adoption. In the early days of the TEAMS program, staff members could spend more time working with districts and sites. As the number of sites and partners increased, it became impossible for staff to spend the same amount of time with new receive sites. It has also become a problem for TEAMS regional coordinators to spend as much times with sites because the program use has expanded significantly in the areas of each city or state partner. Because of this, an implementation model is necessary. It provides a best practices model for all adopters of the TEAMS program.

The implementation model will be helpful for TEAMS staff, regional coordinators and for site coordinators as a procedure to follow in helping new users successfully adopt TEAMS. As a recommended set of procedures to follow at a site, it provides the impetus for the site coordinator to follow the suggestions, or to emphasize the necessity of following the recommendations to administrators and teachers to ensure a successful adoption.

The implementation model is also useful to analyze a TEAMS site that has not had a successful adoption of TEAMS. By using the guidelines as a checklist, it could be determined how many of the recommended procedures were not followed. If very few guidelines had been followed, the site would be provided with a reason for an unsuccessful implementation and adoption of TEAMS. Then, the guidelines could be followed and those steps taken if it thought that the low adoption could be reversed.

The model is useful as an implementation guideline for all distance learning programs with modifications for certain program components which may or may not be a component of TEAMS. The component of the model include how the program is introduced, institutionalization of the program, technical dimensions, and overall program design

As more schools use TEAMS, it is impossible for staff to visit every school and assist firsthand with the

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implementation. As a result, it becomes important to have a clearly defined statement of the implementation plan that has been most successful at TEAMS sites throughout the United States. The validated implementation plan can be used by TEAMS staff to determine if the current implementation recommendations have been useful and to adjust and add new implementation methods that have been validated. This will ensure that the TEAMS program is effectively implemented at state departments of education, state regions, districts, schools and in the classroom. The validated implementation model will also ensure a cost efficient implementation and a productive start-up for new TEAMS users.

Problems

Very few problems were mentioned by teachers. Program times seldom meshed with schools in any time zones. Problems in receiving printed materials which were reported in the first year of the evaluation, diminished in the second. Few technical problems were reported, but more interest in the use of educational technologies resulted in requests for more funding to purchase computers, program kits, telephone lines, and additional television sets. Lack of funding was consistently mentioned by respondents as a concern as it prevented access for all students.

Several districts have moved to a full year model for classes. In the case of one large district (Los Angeles Unified School District), students are released for up to two months during the traditional school year. For those students who are out of school during TEAMS broadcasts, the use of video tapes is the only option. During the summer, these students do not have access to other students, to the distance learning instructor, or other means of interaction. If more schools adopt the full year model, TEAMS should consider programming for the summer months.

Table 9: Factors that facilitated or impeded the use of TEAMS

Factors that facilitated the use of TEAMS	Factors that impeded the use of TEAMS
Planning and preparation time	No planning and preparation time
Kits had all materials including all hands-on materials	Sharing equipment and kits
Equipment telephone, VCR, cabled classroom	Lack of equipment telephone, VCR, cabled classroom
Cable/Satellite access to program in regular classroom	Moving to resource classrooms viewing programs with other classes
Printed materials that provided information for teachers and work materials for students	Low photocopy budgets
Good lesson plans	
District and administrative support	Low district or administrative support Low staff morale
Ability to tape/show programs when convenient professional development programs	Remembering to tape the program
Broadcast times; ability to tape programs	Broadcast times; taping programs
Bilingual aides	Lack of bilingual materials

Summary

TEAMS was chosen by districts, principals, and teachers for a variety of reasons including the fact that it was based on the mathematics and science standards/recommendations, hands on procedures, and distance delivery, which would enhance teaching and learning. Schools and teachers continued to use TEAMS in the second, third, and fourth years because it fulfilled its original promise.

Students are learning from TEAMS. There are increases in skills in mathematics and science content that TEAMS teachers can directly attribute to students participating in TEAMS programming and using TEAMS materials. Teachers reported that students who had difficulty learning about mathematics and science through other methods, were now learning from the TEAMS hands-on methods and manipulatives. Students revealed in student focus groups that it was fun to learn with TEAMS as opposed to the "other" way which seemed to be the "hard" way.

Teachers reported a positive change in student behavior even with normally disruptive students. Teachers reported increased self-esteem, increased attendance, and an increased interest by girls in mathematics/science.

Teachers reported that students evidenced their comfort level with new content by using scientific inquiry, increased their participation in science fairs, and selecting TEAMS topics for their science fair projects. Teachers reported that students are more interested and motivated to do mathematics, including students who were lower achievers in math.

TEAMS has effectively provided teachers with new instructional methods by viewing the TEAMS television teacher during the student programming. The model has changed the teaching styles and the instructional methods of teachers by the time teachers have used TEAMS three years. Fourth year TEAMS teachers continue to use TEAMS because students continue to benefit from the programs. The most significant changes in TEAMS teachers were achieved by those who used TEAMS regularly.

Teachers' ability increased in a variety of ways. Because of the TEAMS teaching model they reported increased skills in teaching heterogeneous groups, teaching mathematics/science in an active learning environment, managing the student use of manipulatives, using cooperative learning in mathematics/science instruction, involving parents in their child's mathematics/science education, using the textbook as a resource rather than as the primary instructional tool, using a variety of alternative assessment strategies, and following national mathematics standards/science recommendations

Teachers, students, principals, and site coordinators reported that they liked TEAMS programming and that it was increasing the time allocated to mathematics and science in the classroom. Teachers increased their class time in mathematics and science by an average of four hours per week.

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TEAMS motivates students to learn math and science because they enjoy it and because it maintains their enthusiasm through interaction with the TEAMS television teachers and the use of hands-on manipulatives for learning. TEAMS is also used as a taped program and the student learning in these classes is equivalent to that of the students who view the program live. The TEAMS evaluation showed that special groups of students benefit from participating in TEAMS programs. These include Chapter 1, LEP, special education and gifted students.

The Pacific Mountain Network (PMN) pilot program where TEAMS was delivered by public television stations had a limited success. Approximately fifty television stations requested information about TEAMS. More promotion, awareness, and utilization was undertaken by PMN during 1994-96.

Based upon the evaluation, the TEAMS Distance Learning Implementation Model was validated. There are a variety of elements to the model which include components for the site implementation and components for the instructional program series to be fulfilled by the TEAMS staff. The evaluation identified how the TEAMS program can be most successfully adopted and implemented by a district and its schools. As new users are continually being added, the staff is unable to visit each new school and classroom where the program will be used. The TEAMS Implementation Model provides a guideline for the staff to review current implementation recommendations and emphasize those which are the most useful. This will lead to a cost efficient and smooth startup for new users.

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